

WHAT IS CLAIMED IS:

1. A keypad comprising:
  - a display apparatus having a display surface and a display perimeter surrounding the display surface;
  - a sidewall positioned along at least a portion of the display perimeter, the sidewall extending above the display surface to a sidewall pivot line;
  - a key actuator having a short arm and a long arm, wherein the key actuator contacts the sidewall pivot line, thereby allowing the key actuator to rotate about the sidewall pivot line; and
  - a switch positioned adjacent the key actuator short arm, such that when a force is applied to move the key actuator long arm toward the display, the key actuator rotates about the sidewall pivot line and the key actuator short arm engages the switch.
2. The keypad of Claim 1, wherein the key actuator is positioned such that at least a portion of the display surface is viewable through the key actuator.
3. The keypad of Claim 1, wherein the switch forms a portion of a flexible membrane assembly mounted adjacent to the display, the flexible membrane assembly having a plurality of conductive circuit paths formed thereon.
4. The keypad of Claim 1, wherein the display apparatus comprises a plurality of selectable pixels, and wherein the pixels have a contrast ratio of greater than approximately 2 when the display is viewed from a viewing elevation angle of less than approximately 55°.
5. The keypad of Claim 1, wherein the display apparatus comprises a plurality of selectable pixels, and wherein the pixels have a contrast ratio of greater than approximately 5 when the display surface is viewed from a viewing elevation angle of approximately 0° and from a lateral viewing offset of approximately 0°.
6. The keypad of Claim 1, wherein the display apparatus comprises a plurality of selectable pixels, and wherein the pixels have a contrast ratio of greater than approximately 2 when the display surface is viewed from a lateral viewing offset of approximately 90°.

7. The keypad of Claim 1, further comprising a backlight configured to provide display illumination.

8. The keypad of Claim 1, further comprising a backlight configured to provide display illumination, wherein the backlight comprises a light emitting diode.

9. The keypad of Claim 1, further comprising:  
a backlight configured to generate illumination; and  
a reflector configured to reflect light generated by the backlight onto a liquid crystal display.

10. The keypad of Claim 1, wherein the display apparatus includes a color display.

11. The keypad of Claim 1, wherein the display apparatus includes a monochrome display.

12. The keypad of Claim 1, wherein the switch is configured to create an audible indicator when the key actuator short arm engages the switch.

13. The keypad of Claim 1, wherein the switch comprises a depressible dome switch that generates an electrical signal when the key actuator short arm engages the switch.

14. The keypad of Claim 1, wherein the key actuator is substantially transparent.

15. The keypad of Claim 1, wherein the key actuator has an L-shape, such that the key actuator short arm and the key actuator long arm are substantially perpendicular to each other.

16. The keypad of Claim 1, wherein the display apparatus includes a liquid crystal display.

17. The keypad of Claim 1, wherein the display apparatus comprises an emissive display.

18. The keypad of Claim 1, further comprising a processor, wherein the switch provides an input signal to the processor when the key actuator short arm engages the switch, and wherein the processor provides display data to the display apparatus.

19. The keypad of Claim 1, further comprising a processor, wherein:

the switch provides an input signal to the processor when the key actuator short arm engages the switch;

the processor provides display data to the display apparatus; and

the display data comprises information associated with a function to be performed by the processor upon receipt of the input signal.

20. An apparatus comprising:

a display having a display surface and a display perimeter surrounding the display surface, wherein the display comprises a plurality of display regions;

a sidewall positioned along at least a portion of the display perimeter, the sidewall extending to a sidewall pivot line;

a plurality of key actuators which are clear at least in part, wherein each of the key actuators are associated with and positioned adjacent to one of the plurality of display regions so that at least a portion of a corresponding display region is viewable through a corresponding key actuator; and

a plurality of switches, wherein each of the switches is associated with one of the plurality of key actuators, such that moving the key actuator closer to the display causes the switch to be activated.

21. The apparatus of Claim 20, wherein the switches form a portion of a flexible membrane assembly mounted adjacent to the display, the flexible membrane assembly having a plurality of conductive circuit paths formed thereon.

22. The apparatus of Claim 20, wherein the display comprises a plurality of selectable pixels.

23. The apparatus of Claim 20, further comprising a backlight configured to provide display illumination.

24. The apparatus of Claim 20, further comprising:

a backlight configured to generate supplemental illumination; and

a reflector configured to reflect light generated by the backlight onto at least a portion of the display.

25. The apparatus of Claim 20, wherein the switches are configured to create an audible indicator when activated.

26. The apparatus of Claim 20, wherein the switches comprise depressible dome switches that are activated when depressed.

27. The apparatus of Claim 20, wherein the key actuators are substantially transparent.

28. The apparatus of Claim 20, wherein the display comprises a liquid crystal display.

29. The apparatus of Claim 20, further comprising a processor wherein the switches are configured to provide a signal to the processor when activated.

30. The apparatus of Claim 20, further comprising a processor wherein the processor is configured to provide display data to the display.

31. A method for labeling keys on a keypad, the method comprising:  
positioning a plurality of key actuators over a display, each of the key actuators having a first arm and a second arm, such that pressing the first arm closer to the display causes the second arm to activate one of a plurality of switches; and

electrically connecting the display to a processor configured to provide display data to the display.

32. The method of Claim 31, wherein at least a portion of the display is visible through the key actuators.

33. The method of Claim 31, wherein the display comprises a plurality of selectable pixels.

34. The method of Claim 31, further providing a backlight to illuminate the display.

35. The method of Claim 31, further comprising creating an audible indicator when one of the switches is activated.

36. The method of Claim 31, wherein the key actuators are substantially transparent.

37. The method of Claim 31, wherein the display comprises a liquid crystal display.

38. The method of Claim 31, wherein the switches comprise depressible dome switches that are activated when depressed by the second arm.

39. A computer keyboard comprising:  
a first programmable display having a plurality of display regions; and  
a plurality of computer keyboard keys, each key overlaying at least in part a corresponding display region of the first programmable display and each key having at least a clear top surface so that the corresponding display region is visible.
40. The computer keyboard of Claim 39, wherein the programmable display comprises a plurality of selectable pixels.
41. The computer keyboard of Claim 39, further comprising a display backlight.
42. The computer keyboard of Claim 39, further comprising:  
a backlight configured to generate supplemental illumination; and  
a reflector configured to reflect light generated by the backlight onto the display regions.
43. The computer keyboard of Claim 39, wherein the keys are configured to create an audible indicator when pressed.
44. The computer keyboard of Claim 39, wherein the programmable display comprises a liquid crystal display.
45. The computer keyboard of Claim 39, further comprising a processor, wherein the keys are configured to provide a signal to the processor when pressed.
46. The computer keyboard of Claim 39, further comprising a processor, wherein the processor is configured to provide display data to the programmable display.
47. A computer keyboard comprising:  
a dynamically programmable display having a plurality of display areas;  
a plurality of computer keyboard keys, each key having at least a first clear surface and a switch actuator, and each key positioned over a corresponding display area of the dynamically programmable display; and  
a plurality of switches, wherein each switch is positioned adjacent to a corresponding switch actuator of a corresponding key, and wherein at least a

first of the switches is activated by the corresponding switch actuator when the switch actuator key is depressed.

48. The computer keyboard of Claim 47, wherein the display areas are viewable through the corresponding computer keyboard keys.

49. The computer keyboard of Claim 47, wherein the switches form a portion of a flexible membrane assembly mounted adjacent to the dynamically programmable display, the flexible membrane assembly having a plurality of conductive circuit paths formed thereon.

50. The computer keyboard of Claim 47, further comprising a backlight configured to provide supplemental illumination to the display areas.

51. The computer keyboard of Claim 47, wherein the switches comprise depressible domes switches that generate an electrical signal when the switches are activated.

52. The computer keyboard of Claim 47, wherein the dynamically programmable display comprises a liquid crystal display.

53. The computer keyboard of Claim 47, further comprising a processor, wherein the switches provide an input signal to the processor when activated, and wherein the processor provides display data to the dynamically programmable display.

54. The computer keyboard of Claim 47, further comprising a processor, wherein:

the switches provide an input signal to the processor when activated;

the processor provides display data to the dynamically programmable display; and

the display data comprises information associated with a function to be performed by the processor upon receipt of the input signal.

55. A method comprising:

providing a keyboard base frame;

mounting a keybutton frame assembly in the keyboard base frame, the keybutton frame assembly configured to support a plurality of keys;

mounting a keyboard top frame having a recessed section to the keyboard base frame, such that the keybutton frame assembly is positioned between the two keyboard frames, and such that the plurality of keys are exposed through an open portion of the keyboard top frame; and

positioning a display subassembly in the recessed section.

56. The method of Claim 55, wherein the display subassembly comprises a keypad having a display underlying a plurality of keys.

57. The method of Claim 55, further comprising assembling the display subassembly.

58. A method comprising:

providing a display subassembly base frame;

positioning a flexible membrane assembly having a plurality of dome switches in the display subassembly base frame;

positioning a display over the flexible membrane assembly; and

positioning a plurality of at least partly clear key actuators over the display so that the display is at least partly visible through the key actuators, the key actuators having a switch actuator adjacent the dome switches.

59. The method of Claim 58, wherein the key actuators have an L-shape, such that the switch actuator is substantially perpendicular to a key face.

60. The method of Claim 58, wherein the key actuators have an L-shape, such that the switch actuators are substantially perpendicular to a key face, and such that pressing a key face closer to the display causes the corresponding switch actuator to depress the corresponding dome switch.

61. A keyboard system, comprising:

a first plurality of keys having top surfaces with fixed indicia disposed thereon;

a recessed section;

a programmable display key module disposed in the recessed section, the programmable display key module comprising:

a dynamically programmable flat panel display having a plurality of display areas;

a second plurality of keys, each of the second plurality of keys having at least a first transparent surface and a switch engagement structure, and at least a portion of each key overlaying a corresponding display area of the dynamically programmable flat panel display; and

a plurality of switches, wherein each switch is positioned adjacent to a corresponding switch engagement structure of a corresponding key, wherein at least a first of the switches is activated by the corresponding switch engagement structure when the corresponding key is depressed.

62. The keyboard system of Claim 61, wherein the switches form a portion of a flexible membrane assembly mounted adjacent to the dynamically programmable flat panel display, the flexible membrane assembly having a plurality of conductive circuit paths formed thereon.

63. The keyboard system of Claim 61, wherein the dynamically programmable flat panel display comprises a plurality of selectable pixels

64. The keyboard system of Claim 61, further comprising a processor, wherein:

the switches provide an input signal to the processor when activated;

the processor provides display data to the dynamically programmable flat panel display; and

the display data comprises information associated with a function to be performed by the processor upon receipt of the input signal.

65. The keyboard system of Claim 61, further comprising a processor, wherein:

the switch provides an input signal to the processor when activated;

the processor provides display data to the dynamically programmable flat panel display; and

the processor is positioned within the programmable display key module.